

FIG. 1A

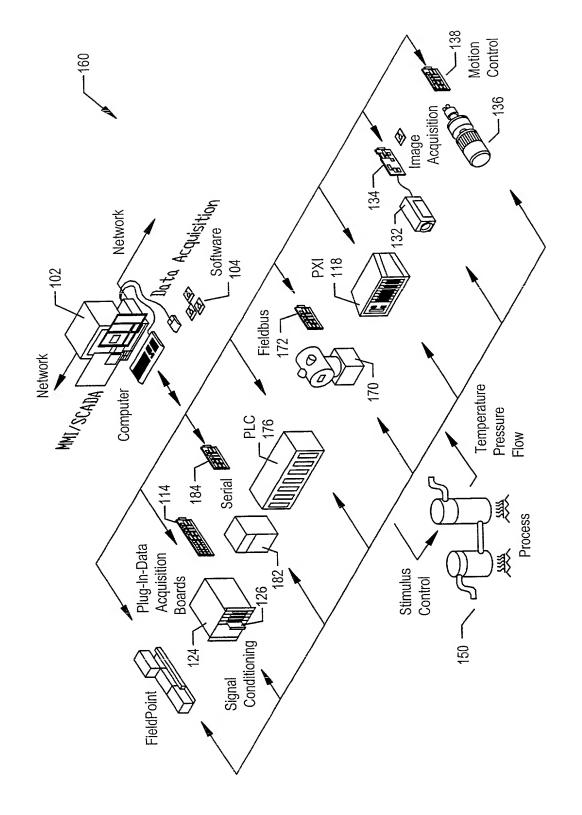


FIG. 1B

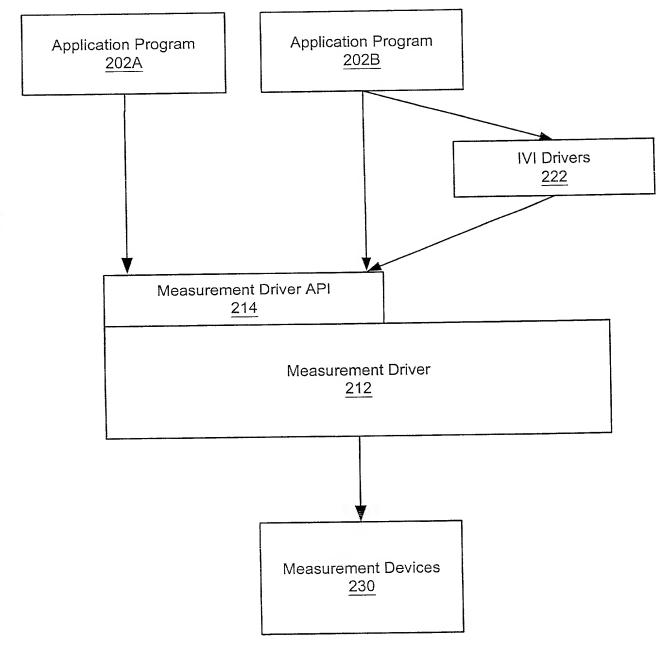


Figure 3

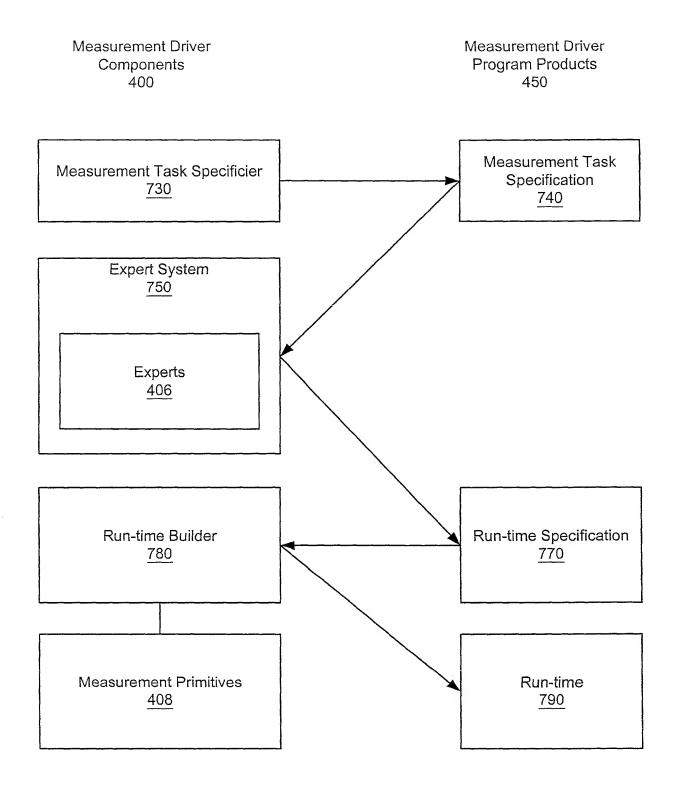


Figure 4

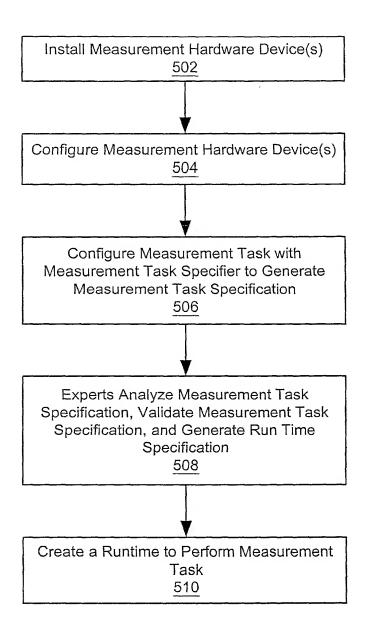
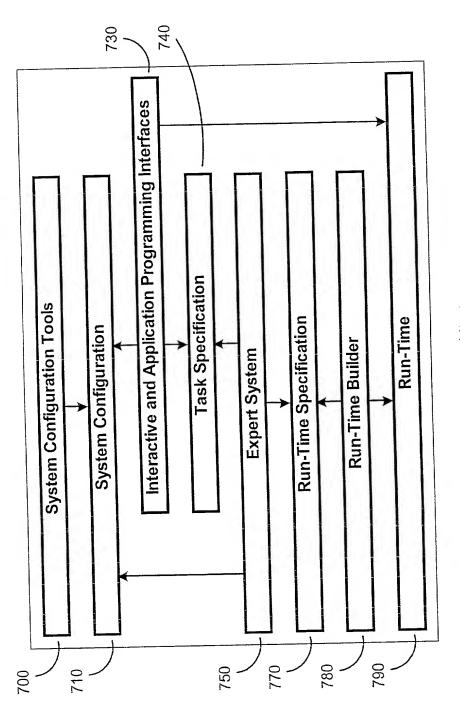


Figure 5

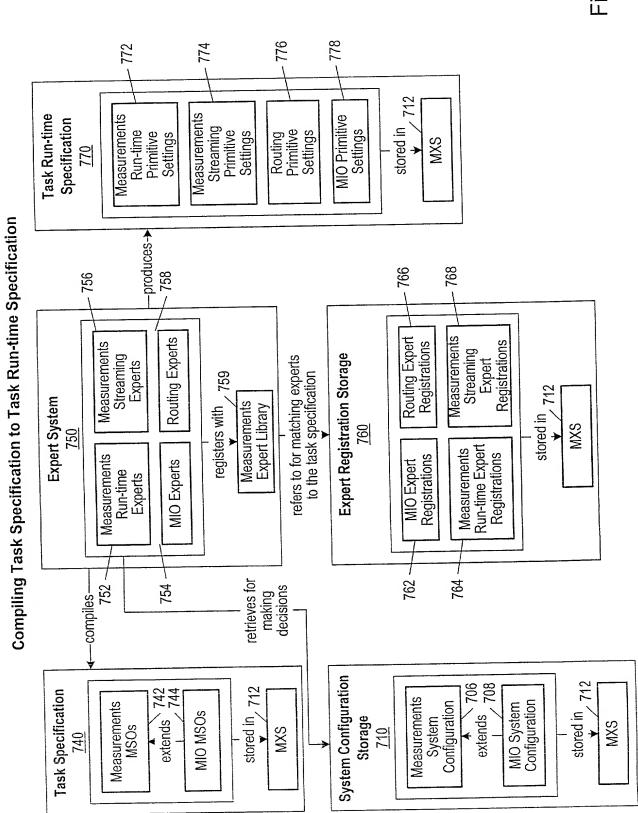


High-Level Architecture

Figure 6

stored in 712 Task Specification 740 extends 742 Measurements Figure 7A MIO MSOs MSOs MXS measurements | specification produces Interactive and Application Programming Interfaces Measurements API for LabVIEW to Measurements MIO Extensions to Measurements API for LabVIEW **MIO Extensions** Measurements API for C API for C extends extends 736 Measurements API for Measurement Studio × 734 Tools for Visual Basic Measurements API for Measurement Studio Tools for Visual Basic MIO Extensions to extends 724 ×714 MIO Extensions to Measurements API Measurements API MIO Configuration Tool Plug-in for Measurement Studio Tools for Visual C++ for Measurement Studio Tools for Measurements Configuration Visual C++ extends extends 100 configuration retrieves system 708 706 System Storage Measurements MIO System Configuration Configuration stored in System extends Fools MXS configuration system produces 704 Configuration DAQ MAX plugs in System Provider Tools MAX 700

System Configuration and Task Specification



Measurements Run-time Streaming Primitives and Supervisors Measurements Primitives and Supervisors Task Run-time 790 Measurements managed by Run-time and Supervisors Primitives and Supervisors **MIO Primitives** Routing Building Task Run-time from Task Run-time Specification **→** splind 794 . 96/ - 789 788 Measurements Routing Primitive Supervisors Streaming Primitive Supervisors 782 creates primitive supervisors for each primitive settings Run-time Builder Measurements Run-time Builder Measurements MIO Primitive Supervisors Run-time Primitive Supervisors 786 784 retrieves-9117 774 772 × 778 712 Task Run-time Specification Measurements Measurements MIO Primitive Streaming Primitive Settings Run-time Primitive Routing Primitive Settings Settings stored in Settings MXS

- 799

798

**Executing Tasks** 

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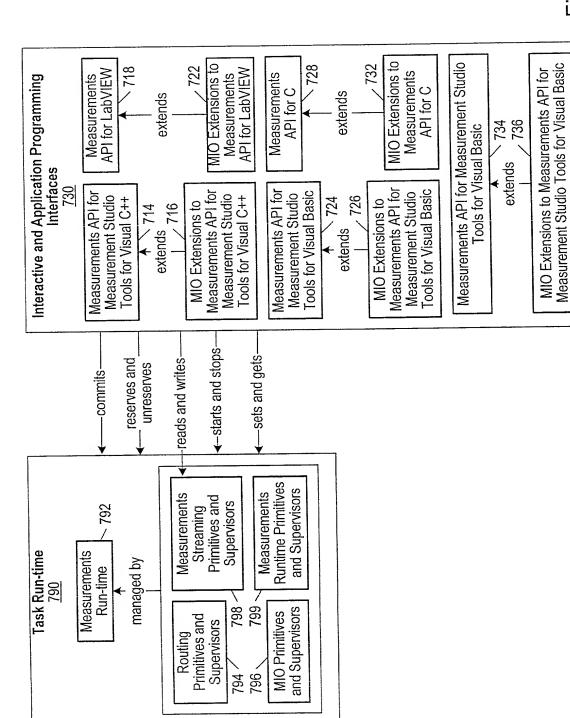
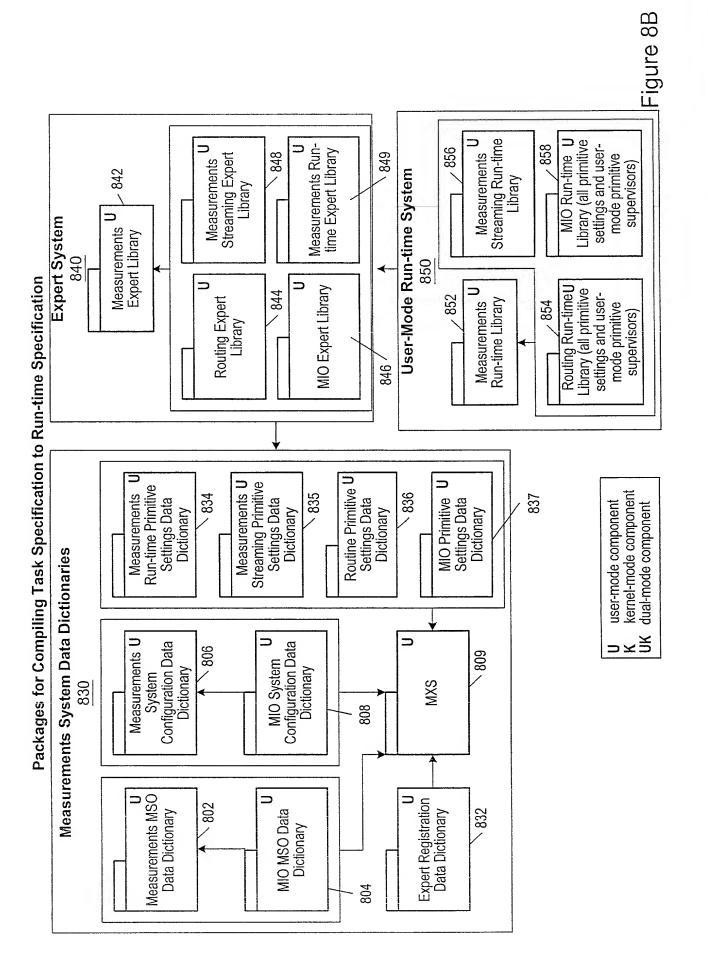
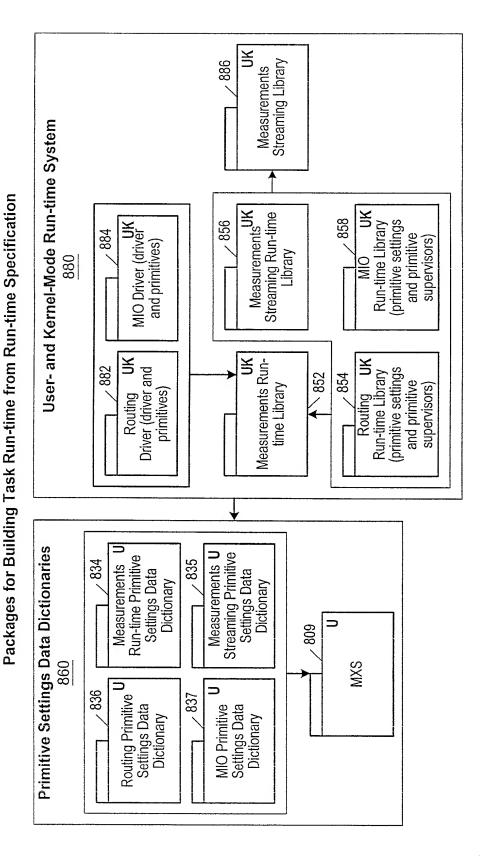


Figure 8A to Measurements API for Measurement Studio Tools for Visual Measurements API U Studio Tools for Visual Basic Library Measurements API U MIO Extensions U Studio Tools for Visual Measurements API for Measurement Studio Tools for Visual C++ 829 828 825 MIO Extensions to ×824 for Measurement for Measurement Basic Library C++ Library Library API Libraries 820 MIO Extensions to Measurements API for LabVIEW Library MIO Extensions to Measurements API for C Library for LabVIEW Library Measurements API for C Library 827 Measurements API 826 823 822 Measurements U Configuration Data Dictionary Configuration Data Dictionary > 806 808 MIO System , 809 System Data Dictionaries 800 kernel-mode component user-mode component dual-mode component MXS Measurements MSO 802 MIO MSO Data Dictionary Data Dictionary 804 System Configuration  $\Rightarrow$ 814 DAQ MAX Provider 812 Tools MAX 810

Packages for System Configuration and Task Specification

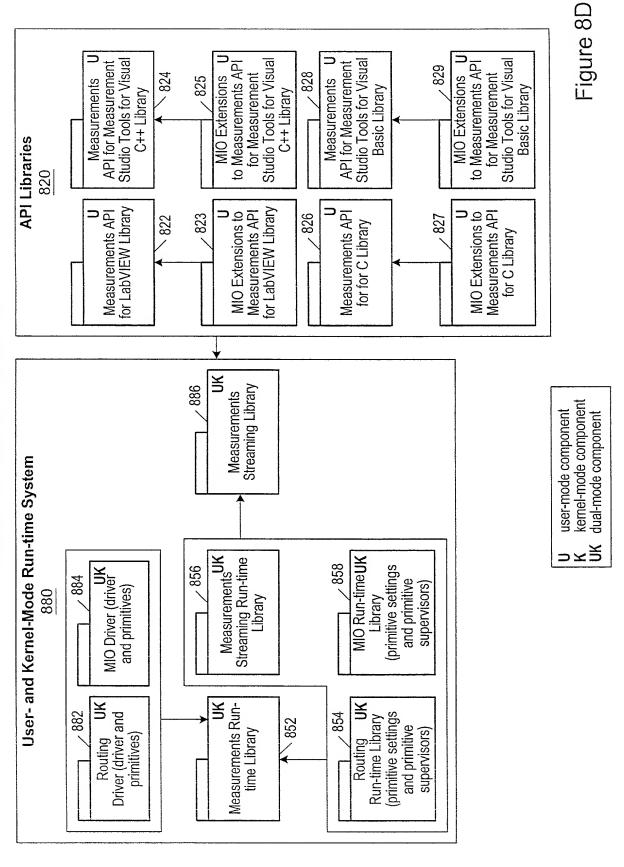


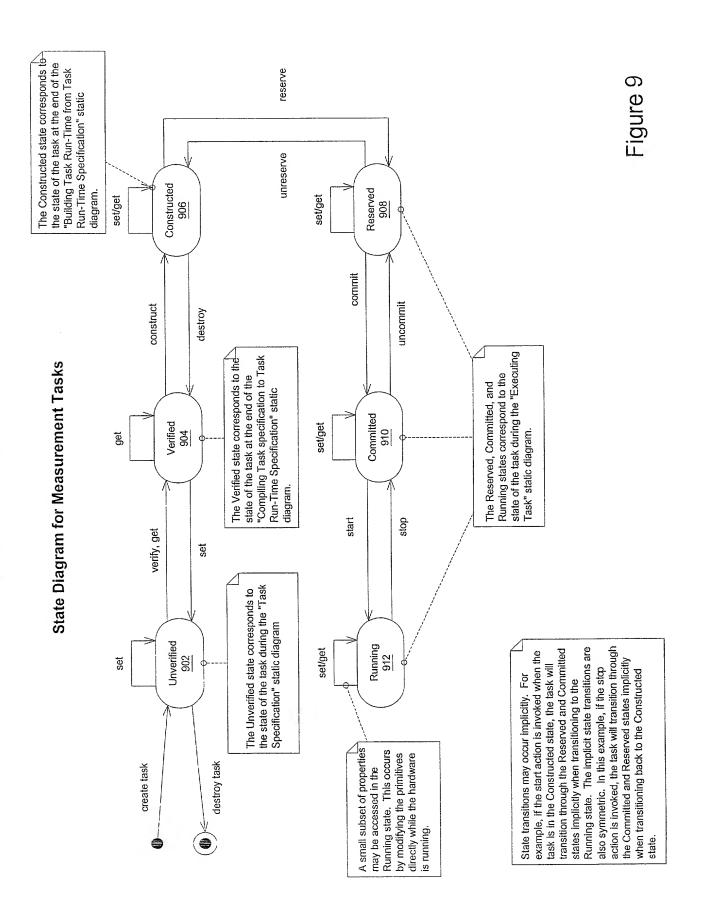


U user-mode component
K kernel-mode component
UK dual-mode component

Figure 8C

## Packages for Executing Task Run-time





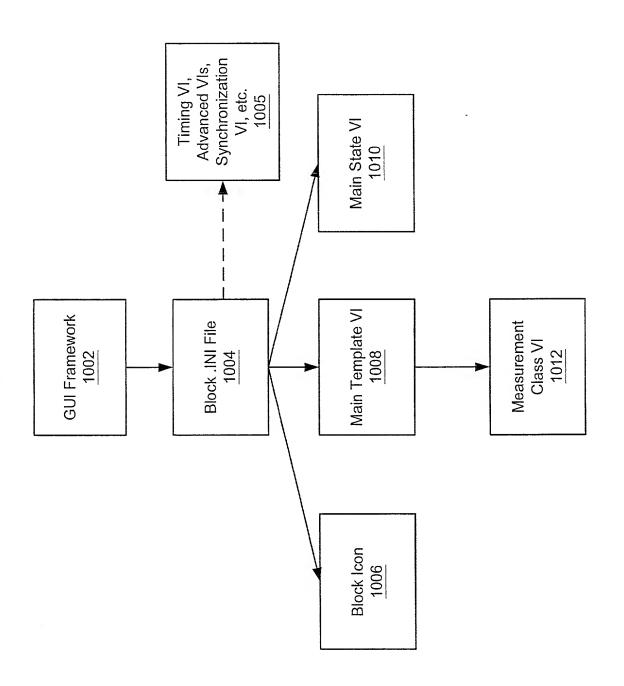


Figure 10

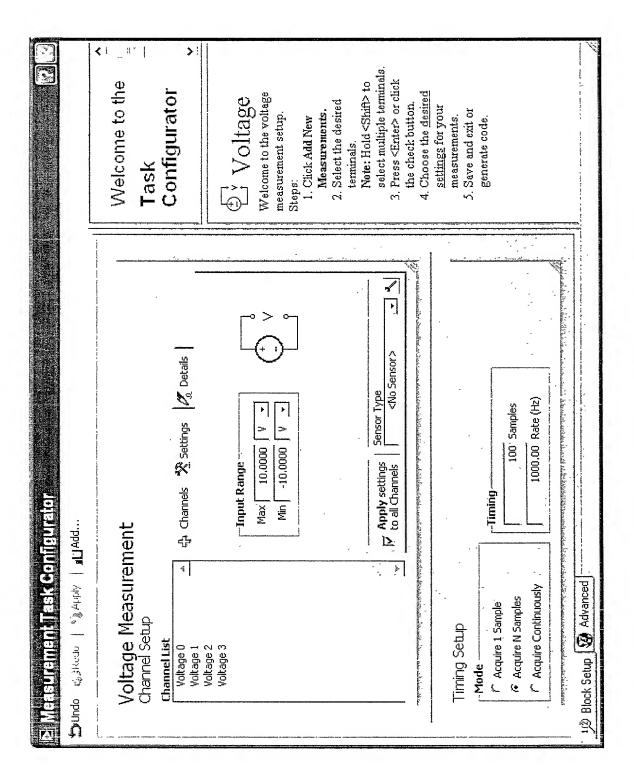


Figure 11

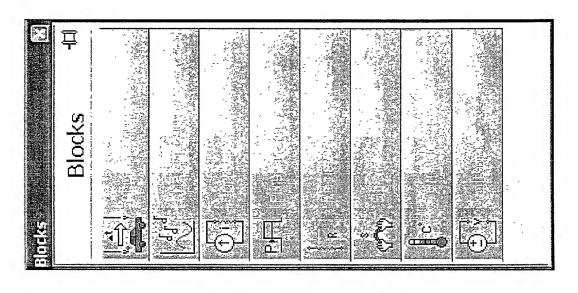


Figure 12A

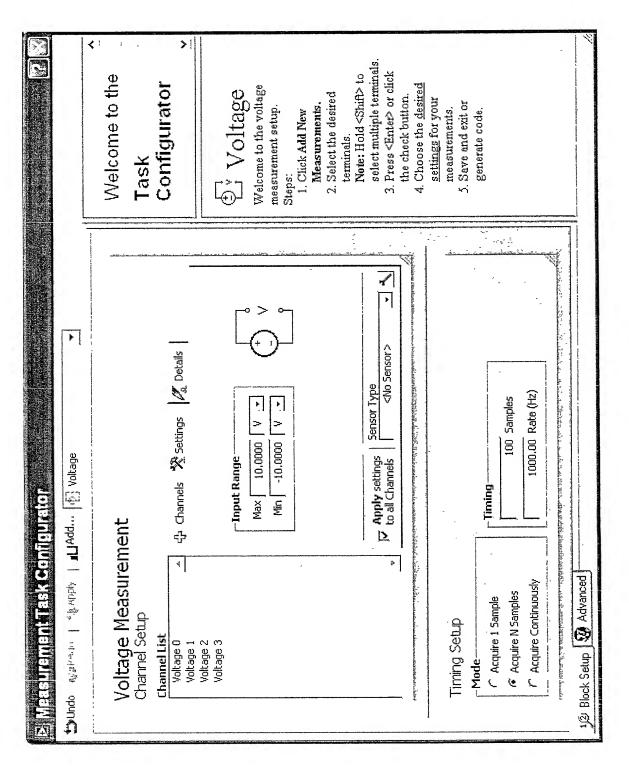


Figure 12B

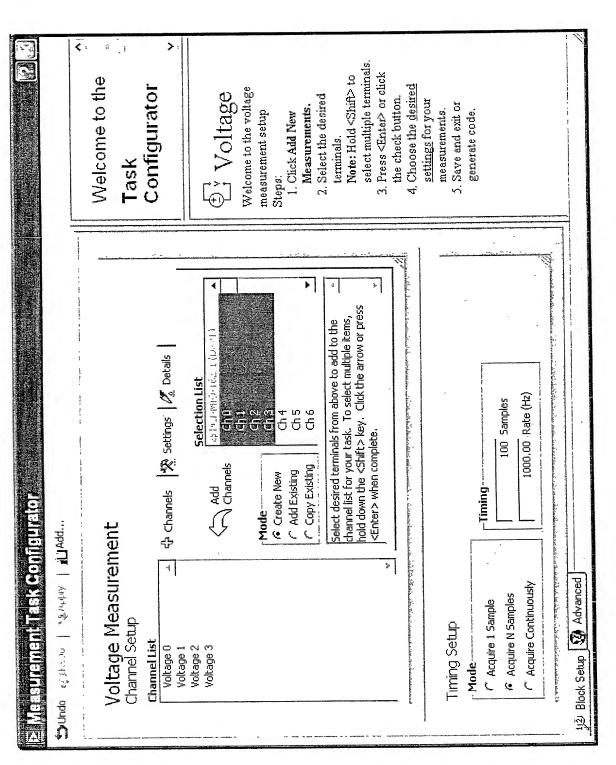


Figure 12C

E Measurement Task Genfigurator	
Undo System Of Apply   LlAdd	
Voltage Measurement	Welcome to the Task
Channel List Voltage 0 4-2 Channels R Settings R Details	Configurator
Voltage 3 Custom Scaling <a href="https://www.scaling.com/">Custom Scaling</a> <a href="https://www.scaling.com/"></a>	Toltage Voltage
Channel Name Voltage 0	Welcome to the voltage measurement setup. Steps:
HW Terminal PCI-MIO-16E-1 (Dev1);::Ch'0	1. Click Add New Measurements. 2. Select the desired
Measurement & Automation Explorer Change channel type	Note: Hold <shift> to select multiple terminals. 3. Press <enter> or click</enter></shift>
popular manufacture and manufacture and manufacture and another and a state of the	the check button. 4. Choose the <u>desired</u>
Timing Setup	settings for your measurements. 5. Save and exit or
-Timing	generate code.
Acquire Continuously   1000,00 Kate (P12)	
1,2 Block Setup 🐼 Advanced	

Figure 12D

····································	
The second secon	
Task Data	Welcome to the
Scaled	Task Configurator
V Stream to Disk   Configuration   Configuration   File Path 'B C:\     Pat	> : 1
Post to the Internet     URL ;http://localhost.MyData	† Voltage
Triggering	measurement setup. Steps: 1. Click Add New
Source Slope Level Trigger Type Analog Level Analog Level	Measurements.  2. Select the desired terminals.  Note: Hold <shift> to select multiple terminals.</shift>
Source Edge Trigger Type Digital Edge	3. Press <enter> or click the check button. 4. Choose the desired settings for your measurements. 5. Save and exit or</enter>
Pause Trigger Type <none> ▼</none>	generate code.
1/2 Block Setup 🚱 Advanced	

Figure 13

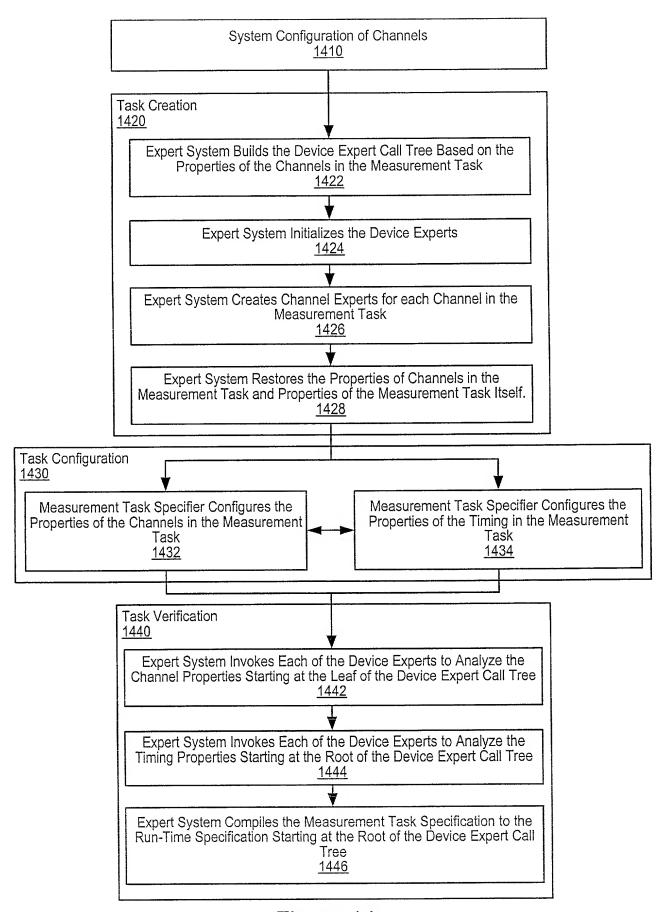


Figure 14

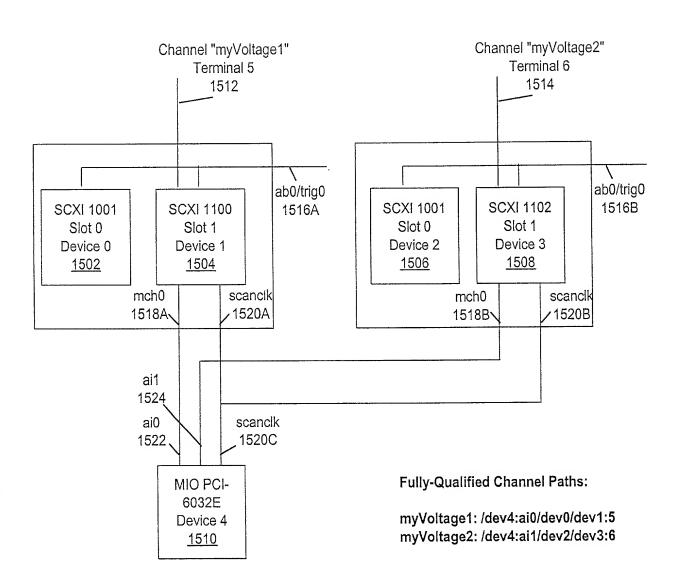
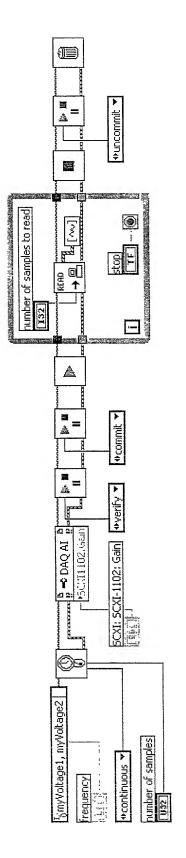
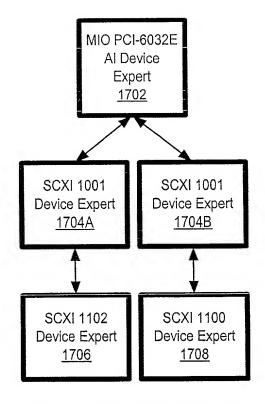


Figure 15



Voltage On Two Channels with Two SCXI Modules in Two SCXI Chassis Connected to an MIO DAQ Device

Figure 16



Create Device Expert Call Tree

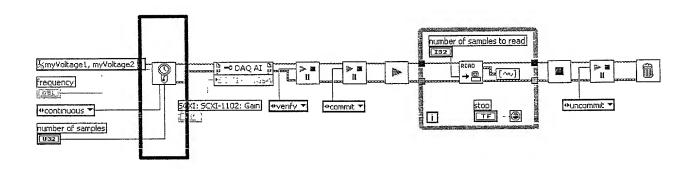
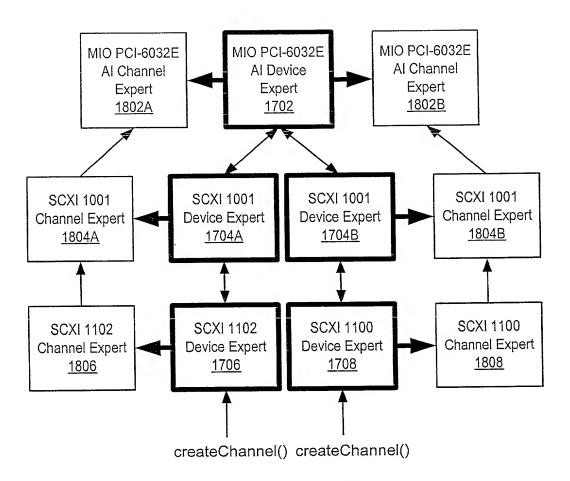


Figure 17



Create Channel Experts

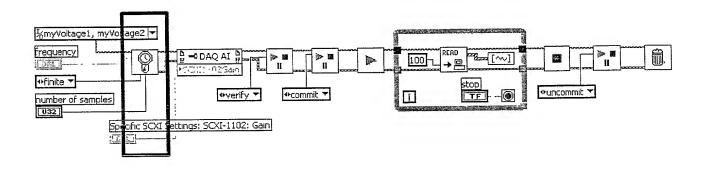
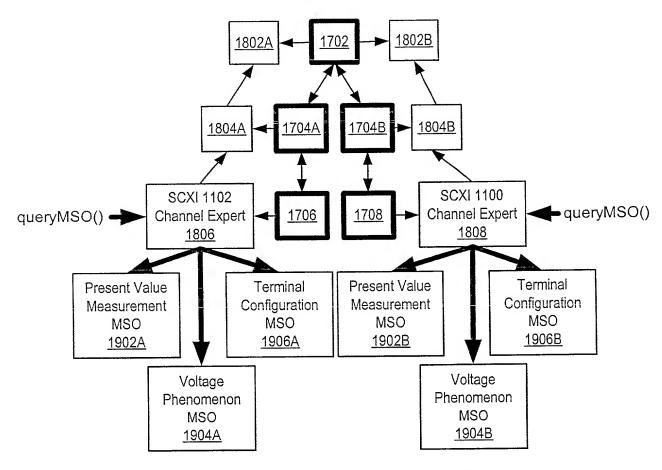


Figure 18



Deserialize Named Channel MSOs

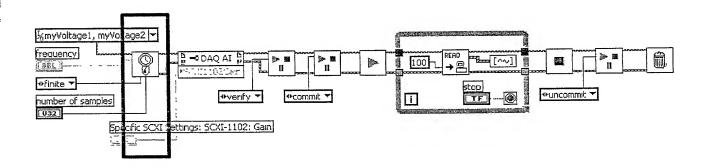
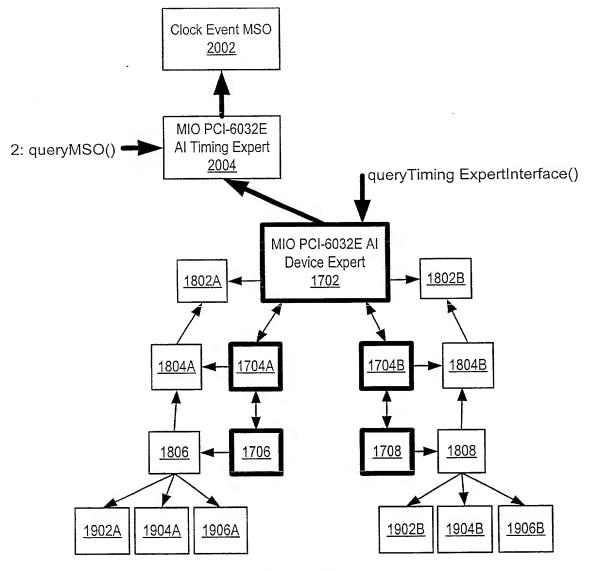


Figure 19



Configure Timing Experts

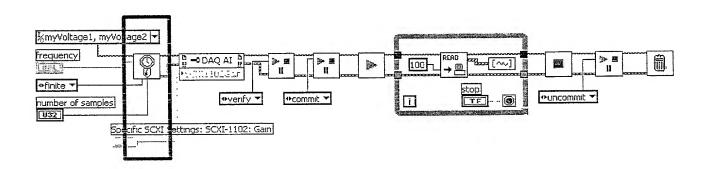
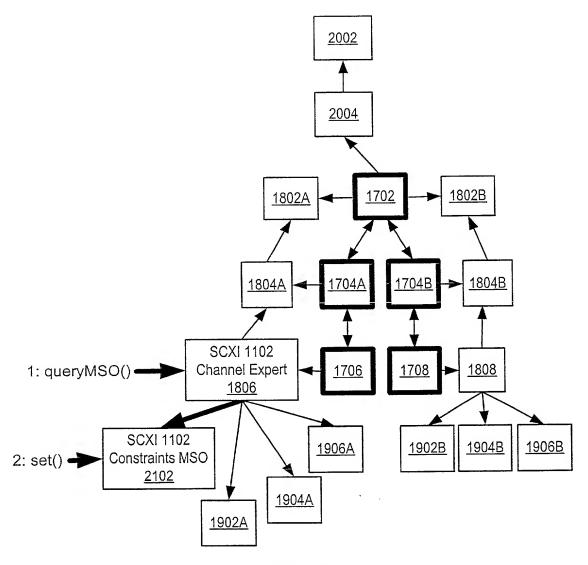


Figure 20



MSO Set Calls

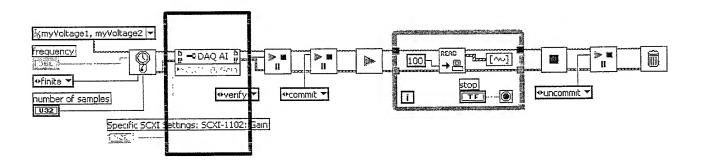
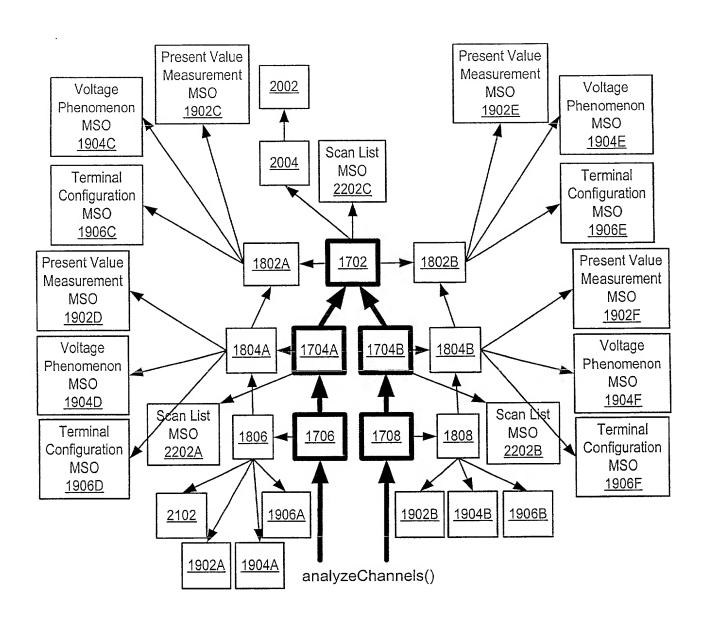


Figure 21



Analyze Channels

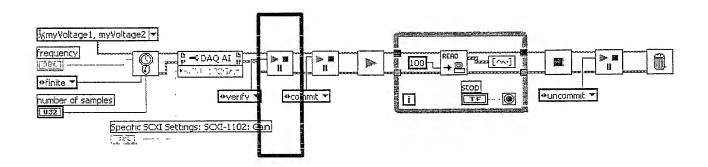
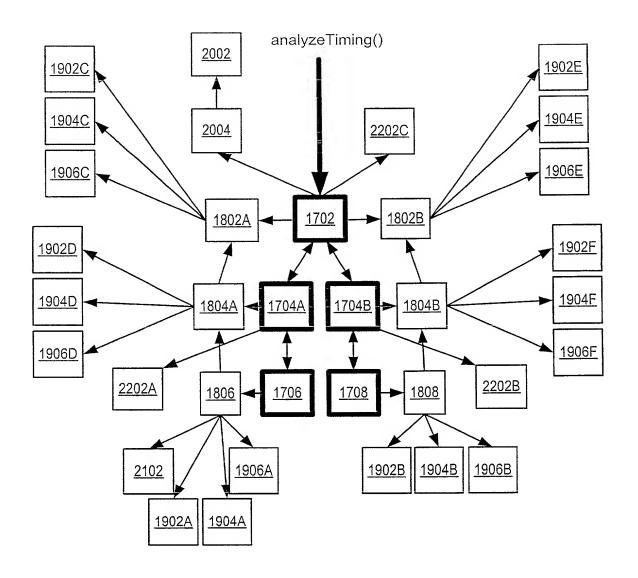


Figure 22



Analyze Timing

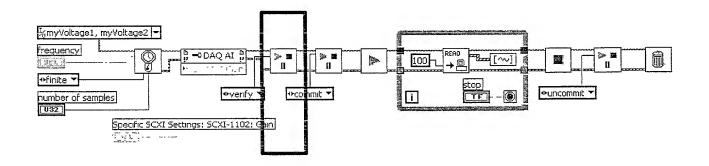
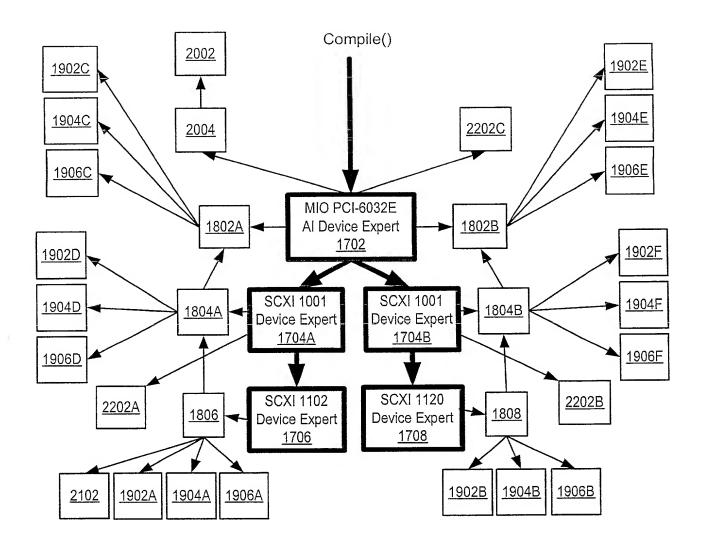


Figure 23



Compile

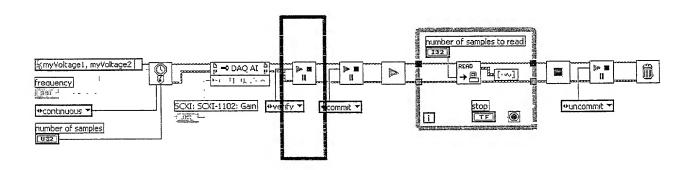
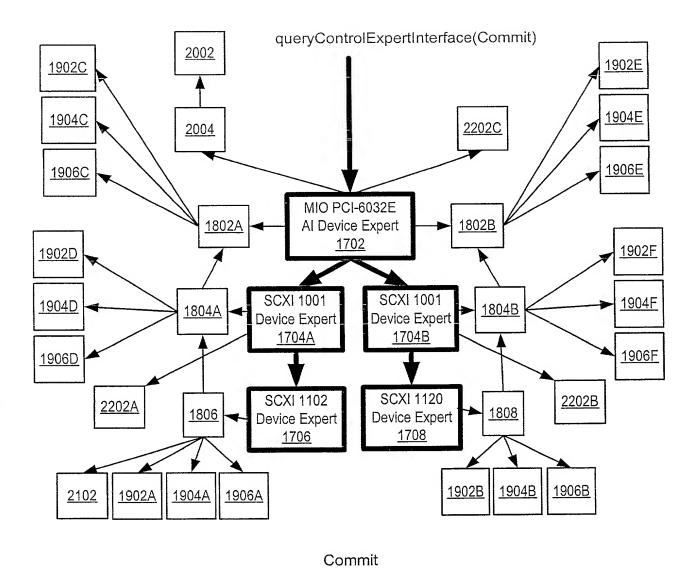


Figure 24A



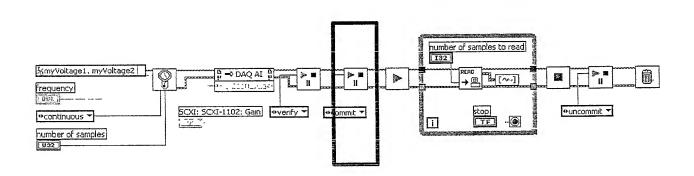
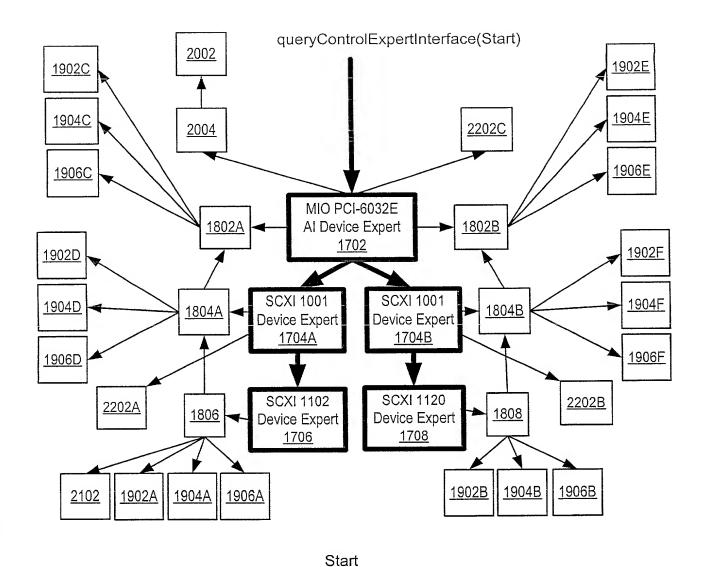


Figure 24B



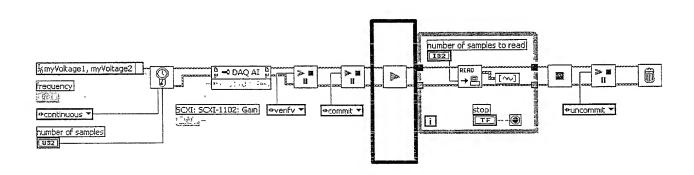
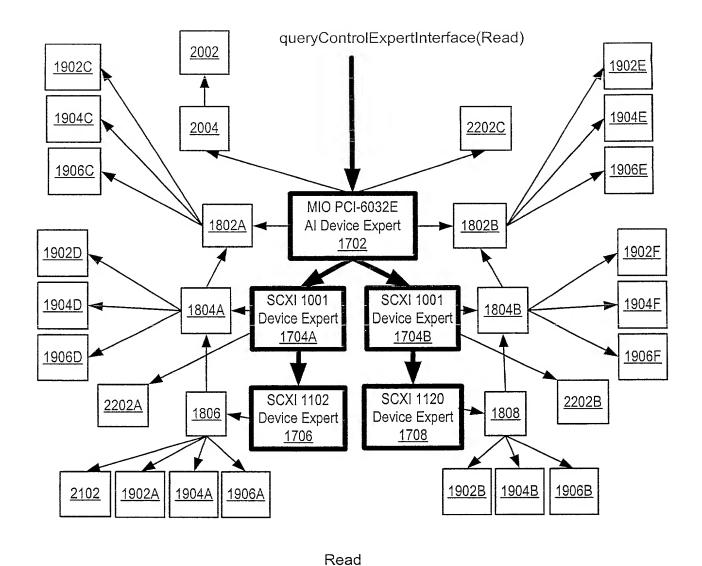


Figure 24C



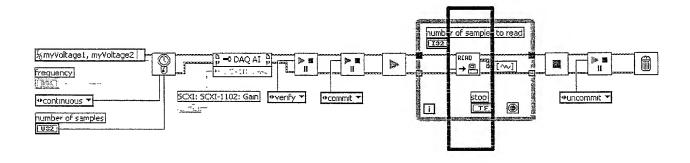
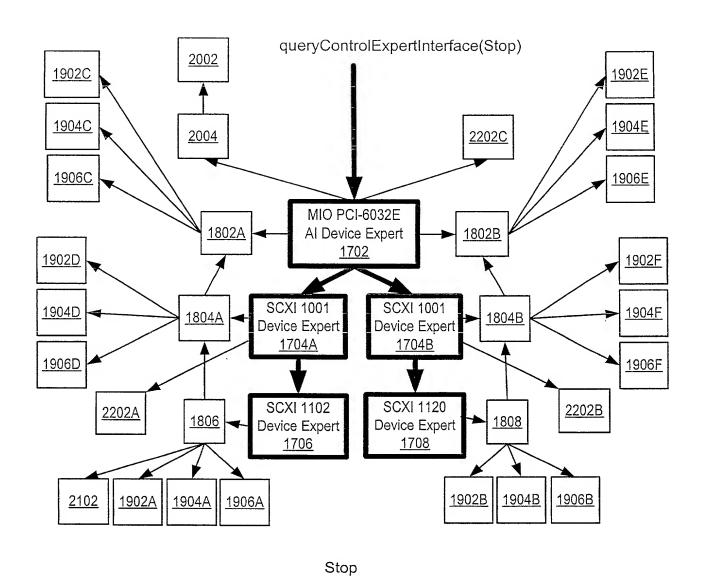


Figure 24D



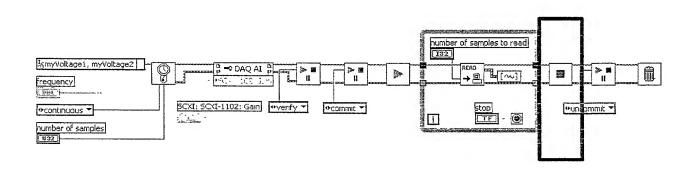
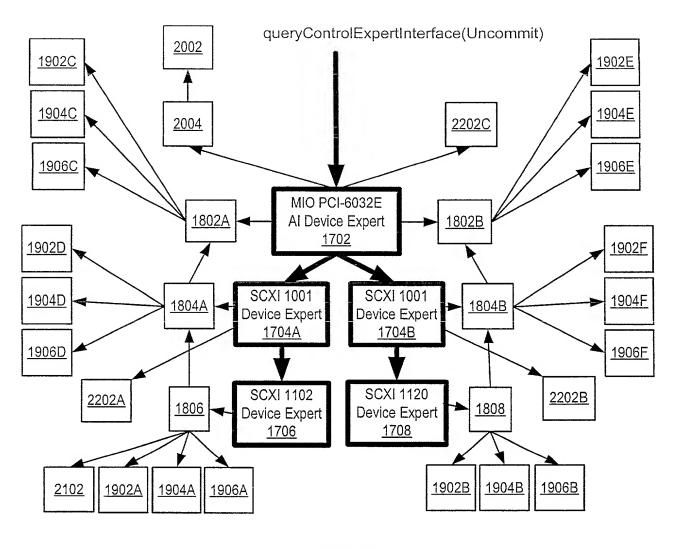


Figure 24E



Uncommit

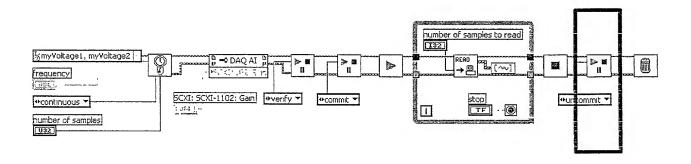
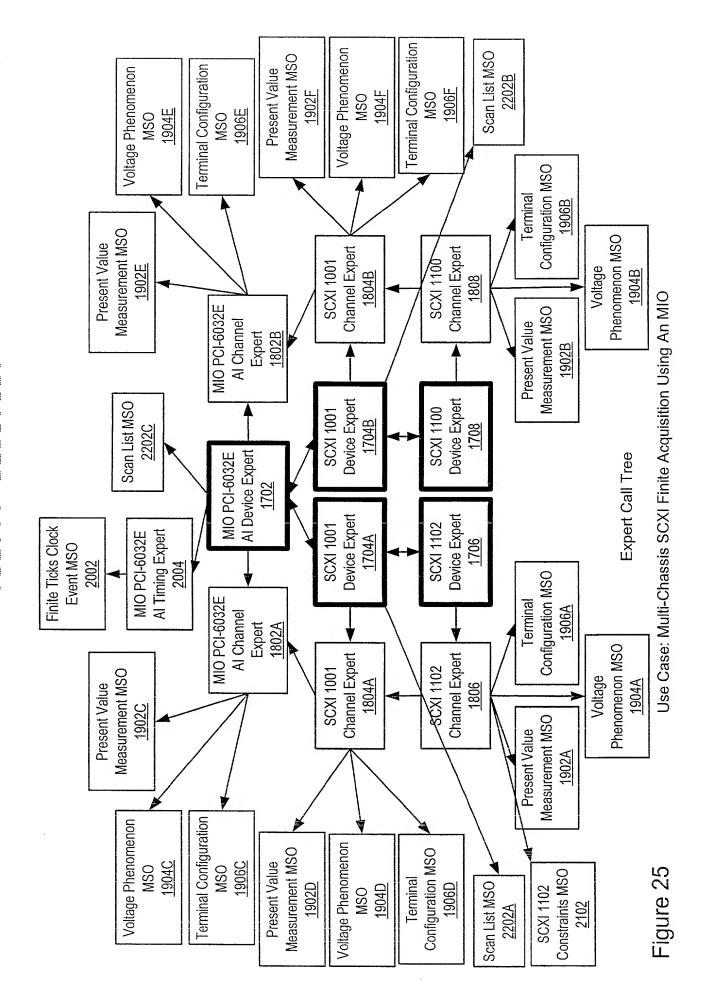


Figure 24F



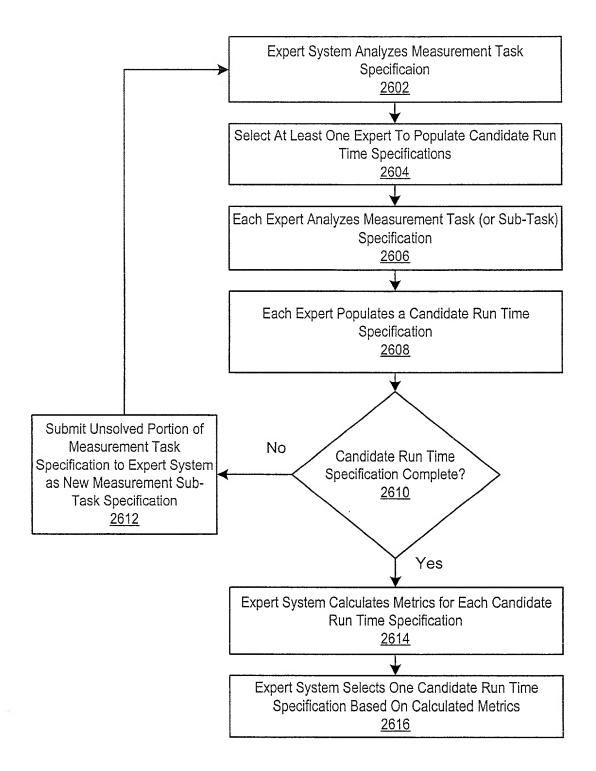


Figure 26

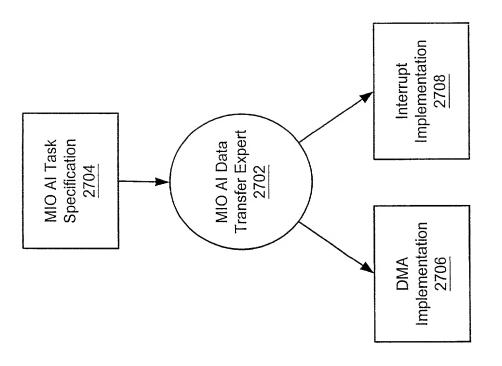


Figure 27

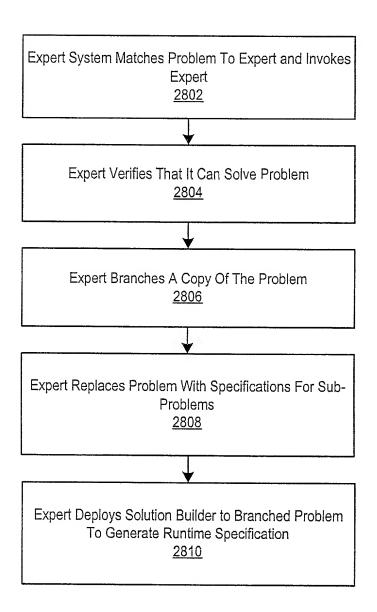


Figure 28

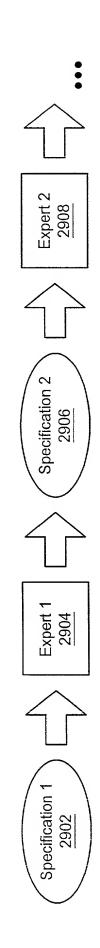


Figure 29

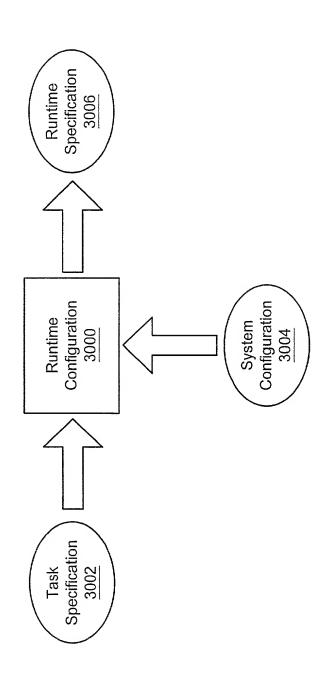


Figure 30

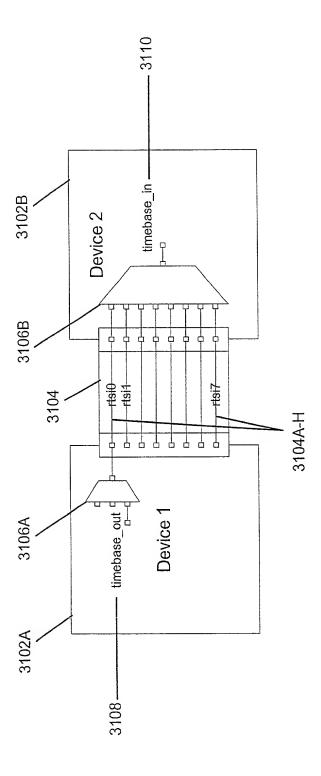


Figure 31

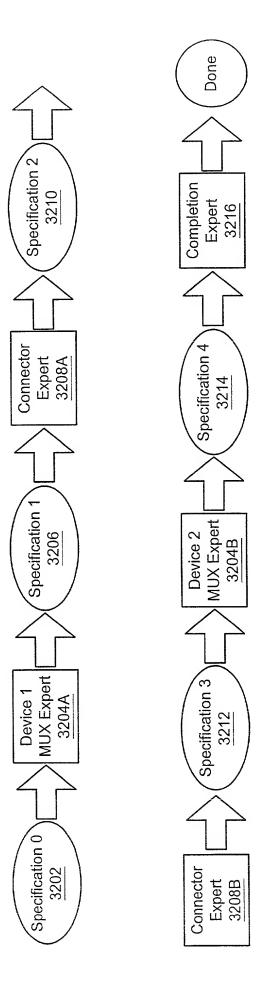


Figure 32

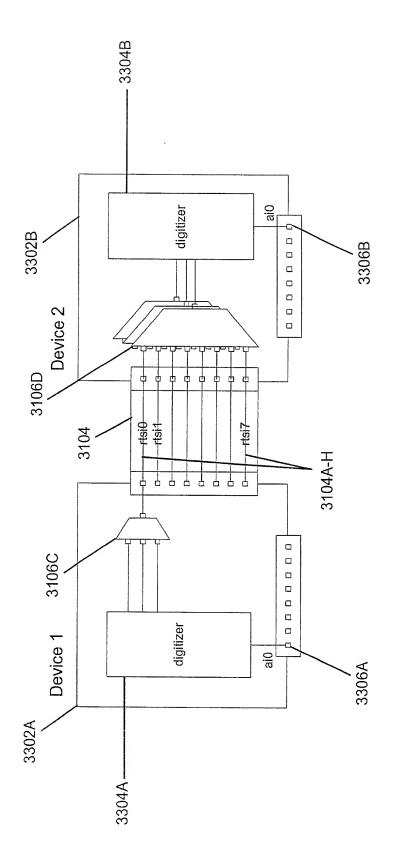


Figure 33

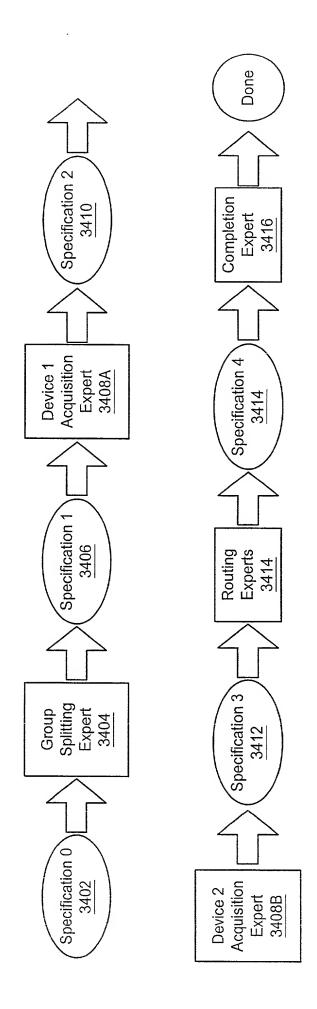


Figure 34

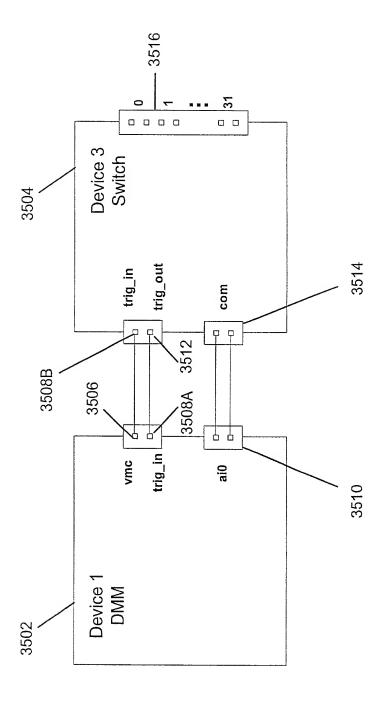


Figure 35

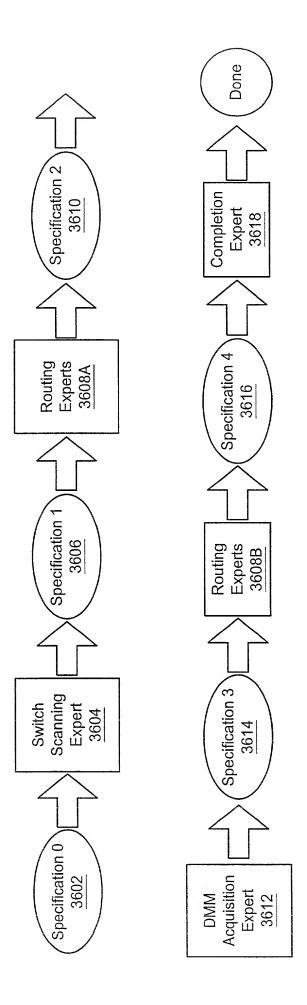


Figure 36

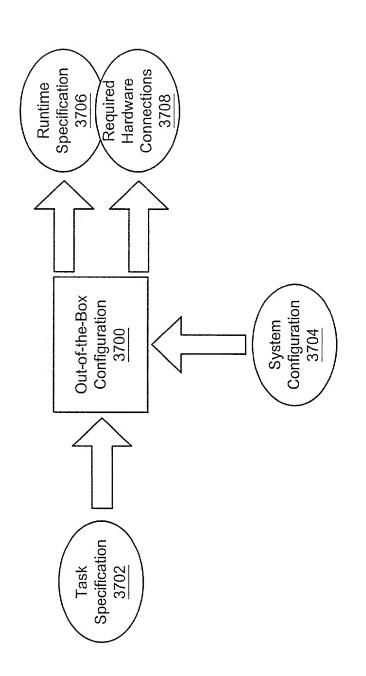


Figure 37

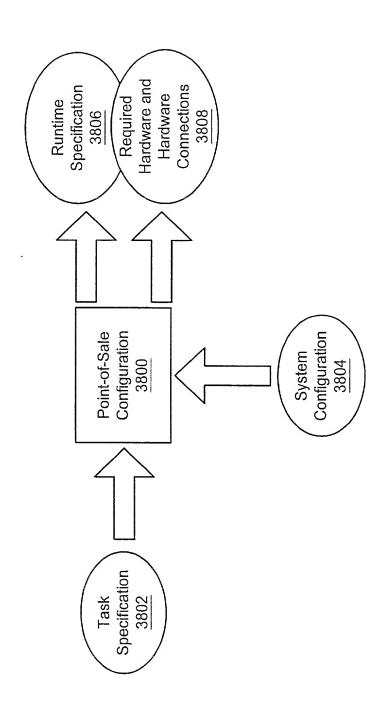
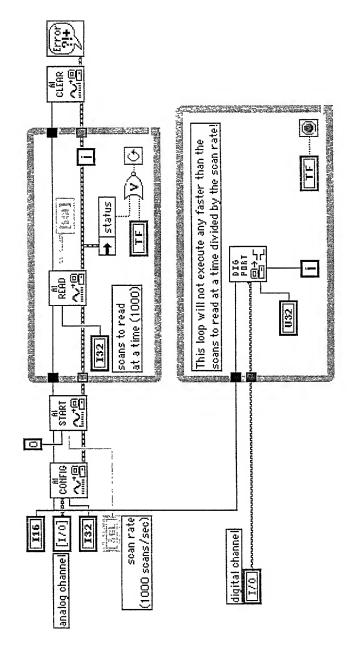
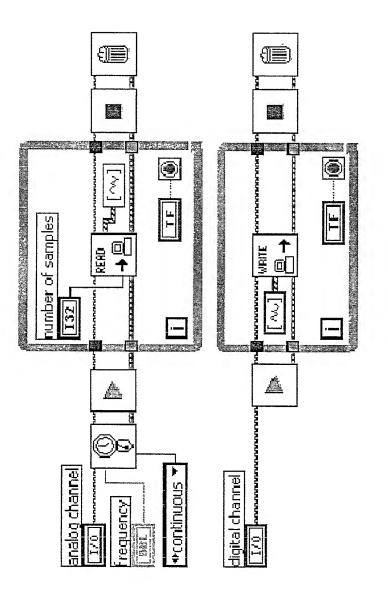


Figure 38



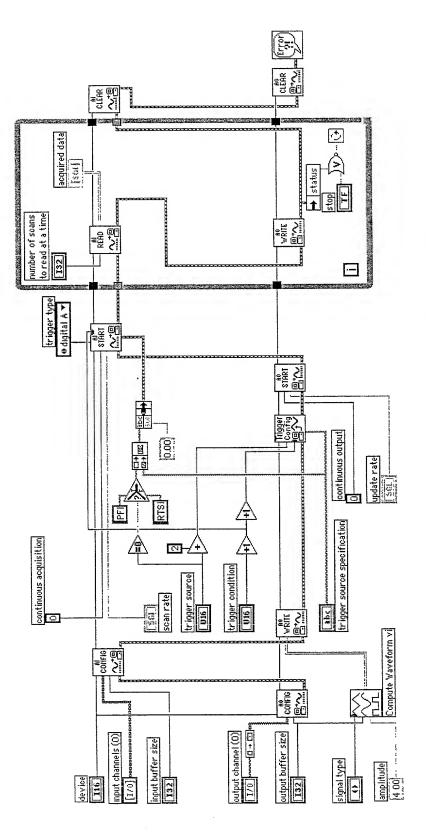
Simultaneous Buffered Analog Input And Single Point Digital Output With Single-Threaded Driver (Prior Art)

Figure 39A (Prior Art)



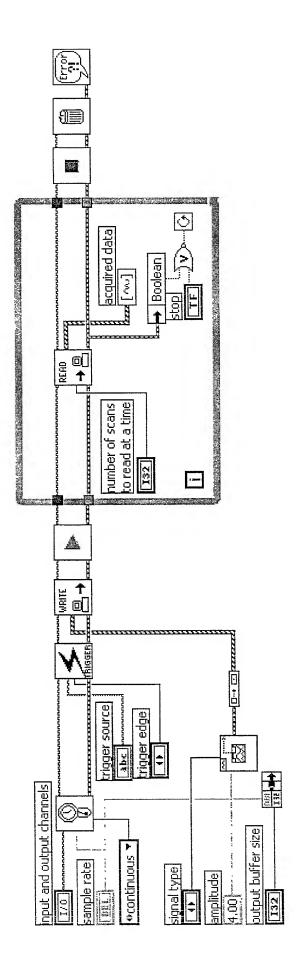
Simultaneous Buffered Analog Input And Single Point Digital Output With Multi-Threaded Driver

Figure 39B



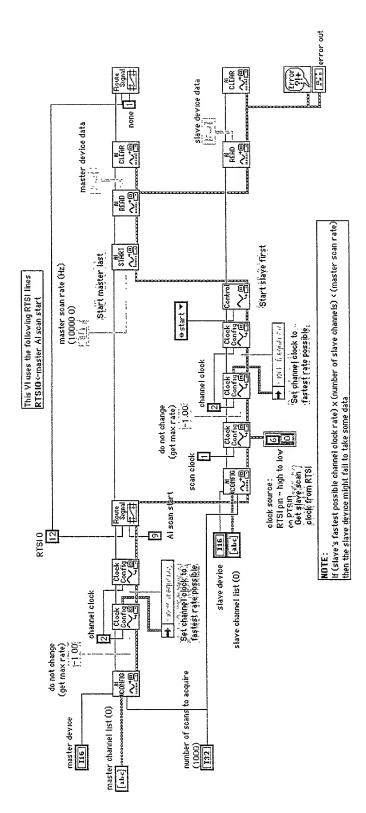
Simultaneous Triggered Buffered AI/AO (Prior Art)

Figure 40A



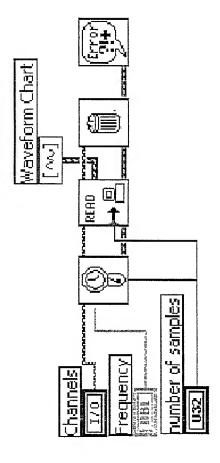
Simultaneous Triggered Buffered AI/AO

Figure 40B



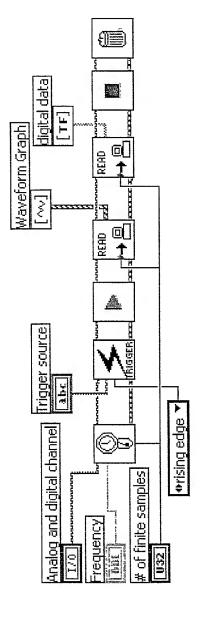
Sharing Scan Clock Across Two E-Series Devices (Prior Art)

Figure 41A



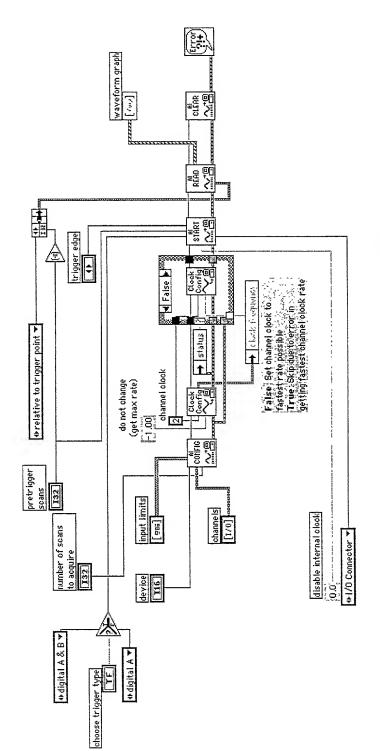
Sharing Scan Clock Across Two E-Series Devices

Figure 41B



Sharing Clock And Trigger, Buffered Al & DI

Figure 42



Acquire N Scans External Scan Clock Digital Trigger (Prior Art)

Figure 43A (Prior Art)

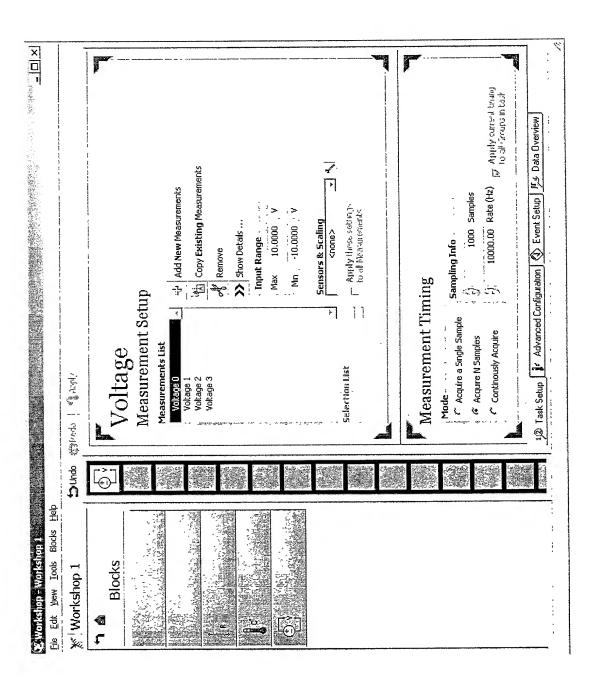


Figure 43B

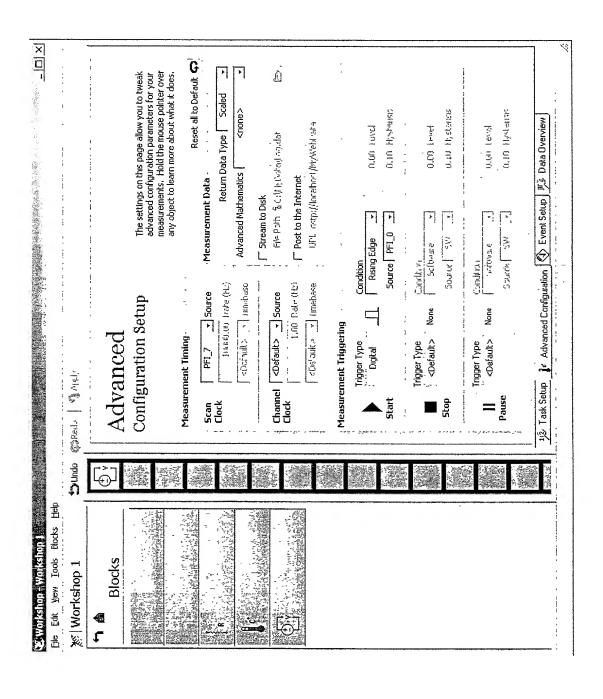
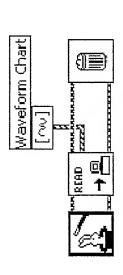
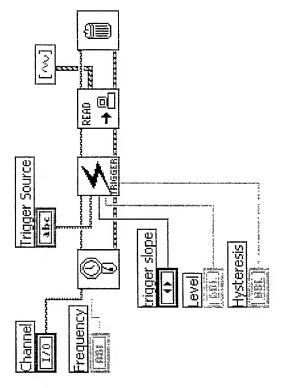


Figure 43C



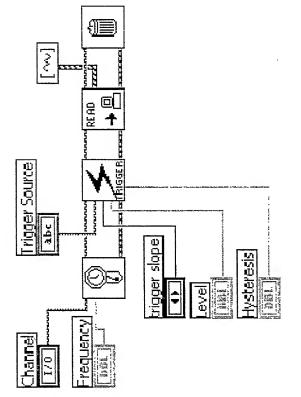
Acquire N Scans External Scan Clock Digital Trigger

Figure 43D



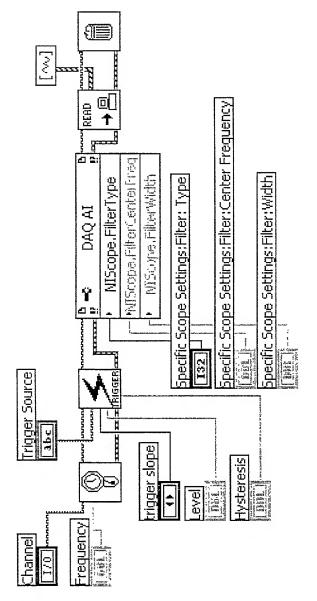
Triggered Acquisition With E-Series Device

Figure 44A



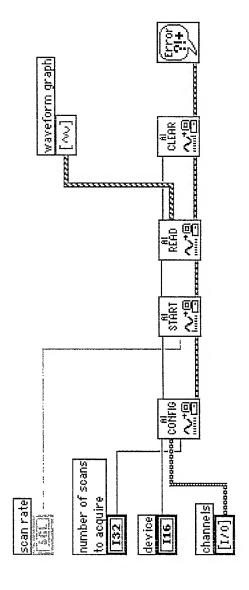
Triggered Acquisition With High Speed Digitizer

Figure 44B



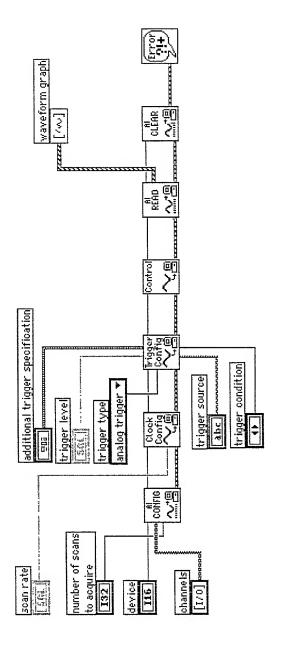
Triggered Acquisition With High Speed Digitizer With Filtering

Figure 44C



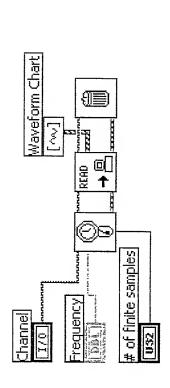
Intermediate Layer (Prior Art)

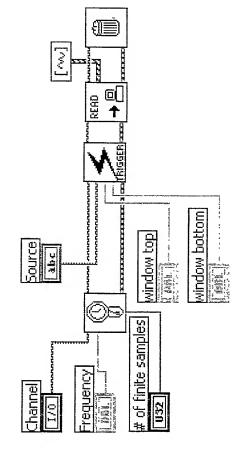
Figure 45A



Changes For Analog Window Triggering (Prior Art)

Figure 45B





Analog Window Triggering

Figure 45C